In the Specification

Please amend paragraph **[0020]** of the application as indicated below:

[0020] The application is best understood with reference to the following drawings wherein like numbers in different figures refer to like components

FIG. 1 <u>(prior art)</u> is an illustration of a typical NMR tool deployed in a bore hole.

FIG. 2 <u>(prior art)</u> is a cross-sectional view of a preferred embodiment of the present invention illustrating the geometry of a preferred NMR probe using the preferred powdered soft magnetic material of the present invention;

FIG. 3 <u>(prior art)</u> is a plot of the isoline for the RF field generated by a preferred embodiment of the present invention utilizing a powdered soft magnetic core;

FIG. 4 <u>(prior art)</u> is a plot of two isolines for the static field generated by a preferred embodiment of the present invention utilizing a powdered soft magnetic core;

FIG. 5 <u>(prior art)</u> is a plot of the isoline for the RF field generated by the probe geometry of FIG. 2 without utilizing a powdered soft magnetic core;

FIG. 6 <u>(prior art)</u> is a plot of two isolines for the static field generated by the probe geometry of FIG. 1 without utilizing a powdered soft magnetic core;

FIG. 7 <u>(prior art)</u> illustrates the isolines for the magnetic flux density of the static field exceeding 0.35 T illustrating that no contour lines appear at the antenna core region;

FIG. 8 <u>(prior art)</u> illustrates the flux density value of 0.35 T as well below the saturation flux density of typical iron powdered soft magnetic materials; and

FIG. 9 <u>(prior art)</u> is an illustration of an alternative embodiment of the present invention.

FIG. 10 shows the results of a ringing test of NMR probes using a ferrite flux guide as part of the antenna assembly.

FIG. 11 shows the results of a ringing test of NMR probes using an amorphous metal ribbon or Fluxtrol™

FIG. 12 shows the magnetostrictive hysteresis associated with Fluxtrol™

FIG. 13 shows the magnetostrictive hysteresis associated with steel.

FIG. 14 shows an exemplary resistivity measurement sensor suitable for use with the present invention.

Please amend paragraph [**0029**] of the application as indicated below:

[0029] Fig. 3 illustrates the isoline <u>**29**</u> for the probe RF field when using the preferred soft magnetic material in the probe geometry of **Fig. 2**. **Fig. 4** illustrates the isoline **41** for the static magnetic field, when using the preferred magnetic material in the core **22** of the preferred probe geometry of **Fig. 2**. The distances shown in **Figs. 3** and **4** are normalized to a NMR probe cross sectional radius of 2". Isolines for field strengths of 0.021T and 0.0205T are shown in **Fig. 4. Figs. 5** and **6** illustrate the isolines for the static magnetic field **51** and the RF magnetic field **61** respectively, for the probe geometry of **Fig. 2**, without using the preferred powdered soft magnetic material in core **22**. Isolines for field strengths of 0.066T are shown in **Fig. 5** while isolines for a field strength of 0.018T and 0.0175T are shown in **Fig. 6**. Comparison of the static magnetic field and RF magnetic field isolines of **Figs. 3** and **4** to the static magnetic field and RF magnetic field isolines of **Figs. 5** and **6**, demonstrates an improvement by a factor of 3 in the RF antenna efficiency and magnet field enhancement, for the probe design of **Fig. 2** using the preferred powdered soft magnetic core material. The reciprocity principle suggests that the probe of **Fig. 2**, using a soft magnetic material core, provides a three-fold gain in probe sensitivity in the receiving mode as well.

Please amend paragraph [0030] as indicated below:

[0030] Fig. 7 is a plot that was generated to show isolines for the magnetic flux density of the static magnetic field exceeding 0.35 T. None are seen. As it is clear from **Fig. 8**, presenting the magnetic hysteresis curve **B1** for the preferred core material, the flux density value of 0.35 T is well below the saturation flux density of the preferred core soft magnetic iron powder materials which is about 1.2T. This value typically exceeds the maximum flux density near the surface of the strongest permanent magnets (e.g., Sm2 Co17), thereby enabling a new variety of geometric core designs, not previously useful in core designs, which required compensation for the limitations of ferrite cores. <u>The magnetic field directions are indicated by **71**.</u>

Please amend paragraph **[0037]** as indicated:

[0037] Turning now to **Fig. 10**, shown are two sets **<u>101, 103</u>** of experimental data showing the spectral ringing of a ferrite flux guide. The abscissa is frequency (ranging from 460kHZ to 540kHz) while the ordinate is the amplitude of the spectra in arbitrary units. The ringing is noticeable in the spectral band from about 490 kHz to 510kHz. The ferrite for which data are shown in **Fig. 10** has a high level of magnetostrictive ringing, which is quite normal for ferrite material.

Please amend paragraph **[0040]** as indicated:

[0040] Turning now to **Fig. 12**, a hysteresis curve **201** for a Fluxtrol® is shown. The abscissa is the current applied to a coil enclosing a sample of the material and the ordinate is the magnetostrictive deformation produced (in μm). The arrows in **Fig. 12** show that as the current is increased, the deformation is increased, but upon reducing the current, some residual deformation will remain. The large area within the hysteresis curve is an indication of high internal dissipation and damping. This is much larger than the hysteresis curve for a steel core shown in **Fig. 13.**